TT-P-19D
February 7, 1985
SUPERSEDING
TT-P-19C
October 6, 1974

FEDERAL SPECIFICATION

PAINT, LATEX
(ACRYLIC EMULSION, EXTERIOR WOOD AND MASONRY)

This specification is approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal agencies.

1 SCOPE AND CLASSIFICATION. This specification covers an acrylic emulsion paint for exterior use on concrete, masonry, and properly prepared wood in the following types:

Type I - High hiding white (suitable for tinting to pastel shades)
Type II - Ready mixed colors
Type III - Medium shade tint base
Type IV - Deep tone tint base

2 APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Specifications:

TT-T-390 - Tinting Medium, Concentrate, General Purpose
PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of

Federal Standards:

Fed. Test Method Std. No. 141 - Paint, Varnish, Lacquer, and Related Materials; Inspection, Sampling, and Testing

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bids or request for proposal shall apply:

American Society for Testing and Materials (ASTM) Standards:

D 476 - Titanium Dioxide Pigments
D 523 - Specular Gloss
D 562 - Consistency of Paints Using the Stormer Viscometer
D 659 - Evaluating Degree of Chalking of Exterior Paints

D 1210 - Fineness of Dispersion of Pigment-Vehicle Systems
D 1296 - Odor of Volatile Solvents and Diluents
D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes
D 1394 - Chemical Analysis of White Titanium Pigments
D 1475 - Density of Paint, Varnish, Lacquer, and Related Products
D 1640 - Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
D 1729 - Visual Evaluation of Color Differences of Opaque Materials
D 1849 - Package Stability of Paint
D 2243 - Freeze-Thaw Resistance of Latex and Emulsion Paints
D 2244 - Instrumental Evaluation of Color Differences of Opaque Materials
D 2369 - Volatile Content of Coatings
D 2486 - Scrub Resistance of Interior Latex Flat Wall Paints
D 2697 - Volume Nonvolatile Matter in Clear or Pigmented Coatings
D 2805 - Hiding Power of Paints
D 3168 - Qualitative Identification of Polymers in Emulsion Paints

American Society for Testing and Materials (ASTM) Standards (Continued):

D 3273 - Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
D 3274 - Evaluating Degree of Surface Disfigurement of Paint Films by Fungal Growth or Soil and Dirt Accumulation and Adjunct No. 12-43270-00 - Pictorial Standards of Coating Defects
D 3335 - Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
D 3723 - Pigment Content of Water-Emulsion Paints by Low Temperature Ashing
D 3960 - Volatile Organic Content (VOC) of Paints and Related Coatings
E 97 - 45-deg, 0-deg Directional Reflectance Factor of Opaque Specimens by Broad-Band Filter Reflectometry
G 53 - Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

3 REQUIREMENTS

3.1 Materials. Titanium dioxide shall comply with type IV of ASTM D 476. Nonvolatile organic material shall consist of a minimum of 95 percent straight acrylic polymer and shall be tested as specified in table II. Material not specified shall be selected by the supplier to meet all requirements of this specification. The paint shall be free from toxic materials under normal conditions of use.

3.2 Qualitative requirements

3.2.1 Condition in container. When examined as specified in table II, the paint shall show no evidence of putrefaction, hard settled pigment, or corrosion of the container. The paint shall be redispersible to a uniform condition by 5 minutes hand stirring without decantation and remixing.

3.2.2 Color (type II). When tested as specified in table II at complete hiding, the paint shall be a critical match to the color specified.

3.2.3 Accelerated storage stability. After storage at 52 deg. C (125 deg. F) for 30 days as specified in table II, a sealed, filled one-liter (one-quart) can of paint shall show no coagulation or hard settled pigment. The paint shall be redispersible to a uniform condition and shall pass the application properties tests specified in 3.2.5.

3.2.4 Freeze-thaw stability. When tested as specified in table II for 3 freeze-thaw cycles, the paint shall show no coagulation or flocculation, the consistency shall not change more than 8 KU, and the paint shall pass the application properties tests specified in 3.2.5.

3.2.5 Application properties. When tested as specified in 4.3.1, the paint shall brush, roll, and spray easily; shall permit lapping after a minimum time of 10 minutes; and shall dry to a smooth uniform film free from lap marks, excessive brush marks, orange peel, craters, or dusting.

3.2.6 Odor. When tested as specified in table II, the odor of the paint in the can and during application shall not be irritating. The paint shall have no residual odor after 24 hours air drying.

3.2.7 Flexibility. When tested as specified in 4.3.2, the paint film shall not crack or flake.

3.2.8 Alkali resistance. When tested as specified in 4.3.3, the paint shall show no blistering or re-emulsification immediately after test. After 24 hours recovery, the film shall show no change in hue or hardness when compared with the untested portion of the paint film.

3.2.9 Biological growth. When tested as specified in table II, the paint shall attain a surface disfigurement rating of 8 or greater when evaluated against Adjunct No. 12-432740-00 specified in ASTM D 3274.

3.2.10 Compatibility (Types I, III, and IV). When tested as specified in 4.3.4, the dried film shall show uniform color and gloss.

3.2.11 Accelerated weathering. When tested as specified in 4.3.5, the paint shall show no chalking and no color change greater than a lightness index difference of 1.5 for types I, III, and IV; a CIE L*a*b* color difference, delta E, of 4.0 for yellow and red hues; or a CIE L*a*b* color difference, delta E, of 2.0 for other hues.

3.3 Quantitative requirements. The paint shall meet the quantitative requirements specified in table II.

TABLE II. Quantitative requirements

Characteristics	Minimum	Maximum
Total solids, percent mass of paint	50	---
Total solids, percent volume of paint	40	---
Nonvolatile organic content, percent mass of paint	19	---
Consistency, KU	80	100
Fineness of dispersion	4	---
Reflectance (Type I only)	90	---
60 deg. specular gloss	---	20
Drying time, set-to-touch, minutes	10	---
Dry through, hours	---	2
Volatile organic content (VOC)	---	250 (2.1)
Titanium dioxide, kilograms per liter (lb/gal)		
Type III	0.20 (1.7)	---
Type IV	0.08 (0.65)	---
Contrast ratio		
(Types I and II at 11.0 m^2/L (450 ft^2/gal)]		
Reflectivity 80 and above	0.95	---
76 - 79	0.96	---
72 - 75	0.97	---
68 - 71	0.98	---
61 - 67	0.99	---
60 and lower	1.00	---
Lead, percent mass of nonvolatile	---	0.06

3.4 Special marking. Each container and shipping container shall be marked:

"PROTECT FROM FREEZING - STORE ABOVE 2 deg. C (35 deg. F)"

4 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or order, the contractor is responsible for the performance of all inspection requirements specified herein using facilities approved by the Government. The Government reserves the right to perform any of the inspections set forth herein when deemed necessary to assure that the paint conforms to prescribed requirements.

4.2 Classification of inspections. Inspections shall be classified as follows:

(a) Quality conformance inspection (see 4.3).
(b) Inspection of preparation for delivery (see 4.2.1).

4.2.1 Preparation for delivery. A random sample of filled containers shall be selected in accordance with MIL-STD-105, inspection level 5-2, acceptable quality level (AQL) 2.5 percent defective, and examined for compliance with 3.4 and section 5.

4.3 Quality conformance inspection. The paint shall be tested in accordance with the methods specified in table II and as otherwise specified herein to determine compliance with the requirements of section 3. Unless otherwise specified, all tests shall be conducted at conditions specified in section 9 of Fed. Test Method Std. No. 141. Failure of any test shall be cause for rejection of the lot from which the sample was taken.

TABLE II. Index

Characteristic	Requirement Paragraph	Test Methods: Fed. Test Method Std. No. 141	Test Methods: ASTM Method	Reference Paragraph
Vehicle Identification	3.1	---	D 3168	---
Condition in container	3.2.1	3011	---	---
Color	3.2.2	---	D 1729	---
Accelerated storage	3.2.3	---	D 1849	---
Freeze-thaw stability	3.2.4	---	D 2243	---
Application properties	3.2.5	2112, 2131, 2141	---	4.3.1
Odor	3.2.6	---	D 1296	---
Flexibility	3.2.7	6221	---	4.3.2
Alkali resistance	3.2.8	---	D 1308	4.3.3
Biological growth	3.2.9	---	D 3273, 3274	---
Compatibility	3.2.10	---	---	4.3.4
Accelerated weathering	3.2.11	6122	D 659, D 2244, G 53	4.3.5
Total solids (mass)	Table I	---	D 2369	---
Total solids (volume)	Table I	---	D 2697	---
Nonvolatile organic material	Table I	---	D 3723	4.3.6
Consistency	Table I	---	D 562	---

TABLE II. Index (Continued)

Characteristic	Requirement Paragraph	Test Methods: Fed. Test Method Std. No. 141	Test Methods: ASTM Method	Reference Paragraph
Fineness of dispersion	Table I	---	D 1210	---
Reflectance	Table I	---	E 97	---
60 deg. specular gloss	Table I	---	D 523	4.3.7
Drying time	Table I	---	D 1640	---
Volatile organic content	Table I	---	D 3960	---
Titanium dioxide	Table I	---	D 1394	4.3.8
Contrast ratio	Table I	---	D 2805	---
Lead	Table I	---	D 3335	4.3.9

4.3.1 Application properties.

4.3.1.1 Brushing properties. Brush the paint in accordance with method 2141, Fed. Test Method Std. No. 141 at a spreading rate of 9.8 m^2/L (400 ft ^{2}/gal) on one-half of a primed gypsum wallboard panel prepared in accordance with method 2081, Fed. Test Method Std. No. 141. Allow the paint to air dry 10 minutes and brush the paint on the other half of the panel to a wet edge and note if the paint can be lapped. Evaluate during brushing and after drying for compliance with 3.2.5.

4.3.1.2 Roller coating properties. Roll the paint in accordance with method 2112, Fed. Test Method Std. No. 141 at a spreading rate of 9.8 m^2/L (400 ft^2/gal). Evaluate during rolling and after drying for compliance with 3.2.5.

4.3.1.3 Spraying properties. Spray the paint in accordance with method 2131, Fed. Test Method Std. No. 141. Evaluate during spraying and after drying for compliance with 3.2.5.

4.3.2 Flexibility. Prepare the test panel in accordance with method 2012, Fed. Test Method Std. No. 141. Supplement the panel cleaning with an additional cleaning with abrasive soap so that the surface shows no water break. Draw down the paint on the clean, dry panel with a film applicator to obtain a dry film thickness of 25 +/- 2 um (0.001 +/- 0.0001 inch). Air dry 18 hours, bake at 105 +/- 2 deg. C (221 +/- 4 deg. F) for 3 hours, and cool 1/2 hour at room temperature. Bend over a 3.18 mm (1/8 inch) diameter mandrel and examine under a magnification of 7 diameters in accordance with method 6221, Fed. Test Method Std. No. 141.

4.3.3 Alkali resistance. Prepare and dry a panel as specified in ASTM D 2486. Test the dried film using 1.0 NaOH solution in accordance with paragraph 6.2, ASTM D 1308. Wash the reagent off with distilled water after 4 hours contact time and examine the film Immediately and after 24 hours recovery.

4.3.4 Compatibility. Thoroughly mix 100 g of paint with 2.0 g of tinting medium concentrate conforming to color la of TT-T-390. Allow to stand undisturbed 5 minutes. Brush a coat of the mixture to obtain a dry film thickness of approximately 37 um (0.0015 inch) on a clean glass panel. While the paint is still wet. rub an area using the index finger in a circular motion for 20 revolutions. Exert light pressure so as not to rub off the film. Allow to dry in a vertical position for 24 hours. Evaluate for compliance with 3.2.10.

4.3.5 Accelerated weathering.

4.3.5.1 Panel preparation. Draw down duplicate films on plane, aluminum panels with a film applicator to obtain dry film thicknesses of 37 +/- 2 um (0.0015 +/- 0.0001 inch). Air dry 168 hours and measure reflectance in accordance with ASTM E 97 or tristimulus values in accordance with ASTM D 2244 as appropriate for the type of paint under test.

4.3.5.2 Exposure. Weather the panels for 300 hours in accordance with ASTM G 53 using FS-40 fluorescent lamps and a cycle of 4 hours UV exposure at 60 deg. C (140 deg. F) followed by 4 hours condensation at 40 deg. C (104 deg. F).

4.3.5.3 Evaluation. Examine the exposed panels for chalking in accordance with ASTM D 659 using a black velvet cloth. Measure the directional reflectance and calculate the lightness index difference in accordance with method 6122, Fed. Test Method Std. No. 141 for types I, III, and IV. Measure the tristimulus values and calculate color difference, delta E, in accordance with ASTM D 2244 for type II.

4.3.6 Nonvolatile organic content. Determine nonvolatile percent and pigment percent as in ASTM D 3723 and report the difference as nonvolatile organic content.

4.3.7 Gloss. Draw down the paint on plane, opaque, white glass panels specified in 2.1.5 of method 2021, Fed. Test Method Std. No. 141 with a film applicator to obtain a wet film thickness of 76 +/- 2 um (0.003 +/- 0.0001 inch). Determine 60 deg. gloss in accordance with ASTM D 523 after 48 hours drying at standard conditions in a dust-free environment.

4.3.7 Titanium dioxide. Place the weighing dish and pigment from 4.3.6 in a wide-mouth 500 ml Erlenmeyer flask and analyze as in 16.3 through 17.2 of ASTM D 1394. (Note: Additional aluminum should not be added as the weighing dish is passivated by the concentrated acid and reacts when diluted. Dilute with caution when cool. The titrant should be standardized using a similar empty weighing dish.)

TiO_2, kg/L = (TiO_2 %)(SpGr of wet paint)/(100)(0.80)

4.3.8 Lead content. Determine lead in accordance with ASTM D 3335 or by the use of an X-ray fluorescence spectrometer capable of determining lead at a minimum range of 0.03 through 1.0 percent mass of non-volatile with an accuracy within plus or minus 5.0 percent. The X-ray method shall be used in case of dispute.

5 PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. The paint shall be furnished in quantities specified (see 6.2). The packaging, packing, and marking shall be in accordance with PPP-P-1892. The levels of packaging and packing shall be A, B, C, or as otherwise specified (see 6.2). The marking shall be civil, military, or as otherwise specified (see 6.2).

6 NOTES

6.1 Intended use. This acrylic emulsion paint is intended for use on exterior concrete, stucco, masonry, and wood. This is a durable, long-lasting coating when applied over properly prepared surfaces. Chalk and loose paint should be removed before painting. New wood should be primed with an oil-base primer. Application temperatures should be above 10 deg. C (50 deg. F) to insure proper drying and film formation.

6.2 Ordering data. Purchasers should include the following information in procurement documents:

(a) Title, number, and date of this specification.
(b) Type and/or color required (see 1.2).
(c) Packaging, packing, and marking required.
(d) Size of container and quantity required.

DoD INTEREST

Military Coordinating Activity:

Navy - YD

Military Custodians:

Army - ME
Navy - YD

Review Activities:

Army - MD, MR

User Activities:

Army - CE
Marine Corps - MC

CIVIL AGENCY INTEREST

CON - NBS
VA - OSS

PREPARING ACTIVITY

GSA - FSS

TT-P-19D
AMENDMENT 1
June 1, 1992

FEDERAL SPECIFICATION

PAINT, LATEX
(ACRYLIC EMULSION, EXTERIOR WOOD AND MASONRY)

This amendment has been approved by the Commisioner, General Services Administration for the use of all Federal Agencies.

PAGE 1

Paragraph 1, delete in its entirety and substitute the following,

1 SCOPE AND CLASSIFICATION

1.1 SCOPE. This specification covers an acrylic emulsion paint for exterior use on concrete, masonry, and properly prepared wood.

1.2 CLASSIFICATION.

Type I - High hiding white (suitable for tinting to pastel shades)
Type II - Ready mixed colors.
Type III - Medium shade tint base.
Type IV - Deep tone tint base.

Paragraph 2.1 under Federal Standards: add the following,

FED-STD-313 - Preparation and submission of Material Safety Data Sheets (MSDS)

Paragraph 2.2, delete the following:

D 659 - Evaluating Degree of Chalking of Exterior Paints
D 1296 - Odor of Volatile Solvents and Diluents

and add in proper sequence:

D 3624 - Low Concentrations of Mercury in Paint by Atomic Absorption Spectroscopy
D 4214 - Evaluating Degree of Chalking of Exterior Paint Films

PAGE 2

Paragraph 3.1, add the following:

Mercury containing materials shall not be used in the formulation of the paint.

Paragraph 3.2.6, delete in its entirety and substitute the following:

3.2.6 Odor. The odor of the paint in the can and during application shall not be irritating.

Paragraph 3.2.11, after "types I, II, and IV;", delete and replace with:

"for type II a CIE L*a*b E color difference shall be a maximum of 2.0.

PAGE 3

Paragraph 3.5, add after 3.4:

3.5 Material Safety Data Sheet. A Material Safety Data Sheet (MSDS) shall be submitted in accordance with FED-STD-313 (see 6.2).

FSC 8010

TT-P-19D, Amendment 1

Table II, delete "D1296" in line 11.

Table II, delete "D659" in line 16 and replace with "D4214"

Table II, add the following:

Characteristic	Requirement Paragraph	Test Methods: Fed. Test Method Std. No. 141	Test Methods: ASTM Method	Reference Paragraph
Mercury	3.1	---	D 3624	---

PAGE 4

Paragraph 4.3.5.2, line 1, delete "300" and replace with "168".

PAGE 5

Paragraph 5.1, delete from "In accordance with..." to the end of the paragraph and substitute "as specified (see 6.2)."

Paragraph 6.2, section (c), add "(see 5.1)" at the end of the line.

Paragraph 6.2, add in proper sequence the following:

(e) Instructions and address for submission of MSDS (see 3.5).

Preparing Activity:
GSA - FSS
(Project NO. 8010-0499)